WHITE PAPER: AN INTEGRATED NETWORK OF TRANSPORTATION INFORMATION

RESPONSE TO THE BROAD AGENCY ANNOUNCEMENT (DTRS56-01-BAA-002) FROM THE RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION OF THE U.S. DEPARTMENT OF TRANSPORTATION

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AN INTEGRATED NETWORK OF TRANSPORTATION INFORMATION

BACKGROUND

The U.S. Department of Transportation's (USDOT's) Research and Special projects Administration (RSPA), through Broad Agency Announcement (BAA) DTRS56-01-BAA-0002, has solicited information and descriptions (in the form of White Papers) of ongoing, currently funded technical or project activity intended to improve the security or reduce the vulnerability of transportation infrastructure, services, and mobile assets to accidental or intentional disruption. In its BAA, RSPA also describes specific areas of interest with respect to innovative transportation technologies, methods and concepts it would like to see addressed in the White Papers.

ITS America believes that transportation technologies can and will play an important role in improving the safety, security, and mobility of the American public, in protecting critical infrastructure, and in crisis management. In this White Paper, the Intelligent Transportation Society of America (ITS America) will describe a future vision for integrated, nationwide deployment of already existing transportation technologies that would improve the security, safety, and reliability (and reduce the vulnerability) of our nation's transportation infrastructure, services, mobile assets, and customers – in other words, an **Integrated Network of Transportation Information** (this concept/vision first appears in the *National ITS Program Plan: A 10-Year Vision*, a document developed by ITS America in cooperation with U.S. DOT.; the document will be submitted to ITS America's Board of Directors on November 29, 2001 for final approval. Should the document not be approved, ITS America shall withdraw this White Paper).

The major activity areas of interest (as indicated in the RSPA BAA) addressed most closely by the Integrated Network of Transportation Information are:

- ♦ Planning for Transportation-Related Contingencies
- ♦ Innovative Approaches to Threat Detection and Evaluation
- ♦ Reduction of Vulnerabilities from Critical Infrastructure Dependencies

- ♦ Approaches to Improving the Robustness of the Information Infrastructure Responsible for Transportation Operational Controls
- ♦ Activities Which Predict and Detect Security Threats in Multi-Modal transportation Services and Operations

THE INTEGRATED NETWORK OF TRANSPORTATION INFORMATION

The Integrated Network of Transportation Information is the "infostructure" that facilitates the monitoring, management, and operation of the entire transportation network. By aggressively deploying Intelligent Transportation Systems (ITS), public and private sector operators, users, and manufacturers of transportation system infrastructure, technologies, and services can cooperate to share, leverage, and use information to improve the safety, security and reliability of our nation's transportation network.

The transportation data to be gathered and managed include real-time information on: the physical state of the infrastructure; how it is being built, used, operated, maintained, and kept secure; its environment, including relevant weather conditions and expectations; and users of the system, including their safety performance and compliance with legal and administrative requirements.

An Integrated Network of Transportation Information will enable:

♦ SEAMLESS TRAVEL FOR PEOPLE AND GOODS: Regardless of age or physical disability of the user, the Network will seek to achieve full coordination between urban bus and rail transit, railway, highway, and arterial systems, and the elimination of missed connections, confusion during detours and diversions, degradation in service based on jurisdictional boundaries, and secondary delay and connectivity problems throughout a trip.

♦ CRITICAL INFRASTRUCTURE PROTECTION AND CRISIS MANAGEMENT: The Network will assist the public agencies that manage the transportation system to detect and understand the nature and extent of a threat, respond to crises, have knowledge of the condition and availability of available resources for response, and mechanisms to help the public get to safety. The Network will help coordinate regional responses to crises and deploy resources quickly and effectively.

♦ SEAMLESS FREIGHT MOVEMENT: Shippers will be provided with door-to-door shipping across carriers and modes without reference to the vehicle or the driver. Freight shipments will be visible across multiple modes and through all stages in the supply chain.

♦ ROAD WEATHER INFORMATION: Significant safety, security, and reliability benefits result when operators and users are provided with tailored weather products, i.e., pertinent information about the impacts of weather on the system and the tools and techniques to deal with them.

The Integrated Network of Transportation Information, once complete, will be the information foundation for multiple and integrated aspects of our transportation system all working in concert to improve safety, security and reliability.

TECHNICAL MERIT OF THE APPROACH

Although there has been continued, progressive deployment of ITS over the last decade, we are only beginning to scratch the surface of the benefits that ITS can bring to the safety, security, and reliability of assets, services, and users of all modes of transportation. ITS will become a powerful enabler in reshaping the ways we build, operate, manage, and use our transportation systems and services. ITS will also become a major economic factor in the United States and around the world, reshaping the ways we live and work and the ways we receive, use, and share information about our mobility. Realizing this potential – and realizing it swiftly – depends on a continued large-scale investment in ITS by both the public and private sectors, and on the continued widespread deployment of ITS.

EXISTING TECHNOLOGIES DEPLOYED

It is important to note that many technologies that can be used in deploying the Integrated Network of Transportation Information already exist, and are currently being used. As with any technology-based program, the process of research and development, evaluation, and deployment is a constant cycle. However, the success of the Integrated Network of Transportation Information does not depend on as-yet-undeveloped technologies to achieve a variety of value-added outcomes.

VALUE-ADDED OUTCOMES ACHIEVED

The continued deployment of ITS in an integrated, nation-wide fashion involving infrastructure, mobile assets, and users offers the opportunity to achieve:

♦ An electronic information infrastructure that works in concert with the physical infrastructure to maximize the safety, security, reliability, efficiency, and utility of the system and encourage modal integration and consumer choice.

♦ Secure systems that can both detect and facilitate response to regional crises.

♦ Far fewer and less severe crashes for all types of vehicles and far faster response and recovery when crashes do occur.

♦ Information for operators and users of the transportation system to help contain congestion and increase the effective capacity of the system while reducing the need for new construction.

♦ Facilities, technology, and information that help reduce energy consumption and negative environmental impact.

♦ A vital domestic ITS industry that is able to compete effectively at home and in the international marketplace.

INTEGRATED NATIONAL NETWORK IS NEEDED

The ability to have robust information about the status of our local, regional, and national mobility (and get it out to travelers and system operators) can be invaluable in times of crisis, whether the crisis is caused intentionally, by accident, or by nature. It can also be invaluable in monitoring the system and activities on/within it, aiding in the prevention and detection of potential crises. In addition, the communications and data redundancy that will occur as the network is deployed will be of local, regional and national benefit.

WIDE-RANGING BENEFITS

Data by themselves do not deliver direct benefits – it takes information. This information, however, can support nearly an unlimited array of applications – only some of which we can describe today – that will deliver efficiency, convenience, cost, safety, and environmental benefits. In all cases, the principal benefit will be based on taking the guesswork out of the operation and performance of the system. All parties in the transportation system will benefit from the positive impacts of the Integrated Network:

IMPLEMENTATION TIMELINE OF PROPOSED TECHNOLOGIES AND CONCEPTS INTO TRANSPORTATION PRACTICE

The deployment of an Integrated Network of Transportation Information is a grand, far-reaching, and enormously worthwhile vision, even as the majority of its components exist and are being used today. Its impact will be enormous in terms of economic productivity, safety, and customer satisfaction with the transportation system.

While there are some analogies between the development of the Integrated Network of Transportation Information and the Internet, the Integrated Network can probably not be left simply to develop on its own, even with a widely shared vision. There need to be checks on quality and completeness of information – an information confidence level – and access to information must be controlled, especially where the information is personal or security-sensitive. In addition, although the process can be guided and led from the center, the activity and benefits will be highly distributed. Also, developing the standards and practices for building and managing the Integrated Network is a significant challenge in itself.

ITS America, in the *National ITS Program Plan: A 10-Year Vision* document it developed for U.S. DOT, envisions a staged deployment of the Integrated Network of Transportation Information. Even more importantly, however, is that all stages of deployment and operation are technology-neutral and focused on outcomes. In other words, the value of the Integrated Network lies in its ability to achieve a set of outcomes (safety, security, mobility, efficiency, etc.,) by implementing a set of functions (traveler information, vehicle location, enhanced 911 services, cargo tracking, etc) that employ some kind of technology – not in choosing a specific type or brand of technology to accomplish or implement them.

Although ITS has provided additional tools and perspectives for expanding information collection and use, information about the transportation system as a whole remains sparse, fragmented, and uncoordinated. The next decade holds the promise to eliminate this information gap in a number of important ways, although, as always, the institutional barriers – including forging new ways for the public and private sectors to work together – will be more complex and daunting than the technical challenges.

The Integrated Network of Transportation Information requires the active cooperation of a wide spectrum of public and private stakeholders both as information providers and as consumers. It involves a massive requirement analysis to understand the needs of these stakeholders, notably including the traveling public. Its success depends most fundamentally on marshalling a national commitment to cooperate, to participate, to contribute, and ultimately to share in the benefits. This White Paper suggests that in the next few years, a Congressional mandate will be required to make the network a national priority, marshal the necessary national commitment, outsource functions to the private sector wherever possible, and provide the bulk of the necessary funding.

However, securing such a Congressional mandate requires much groundwork to be laid first, for which at least initial leadership must come from the U.S. Department of Transportation. ITS America suggests that the groundwork (at least a 1–2 year effort) provide the basis for convening a national summit under the auspices of ITS America that can serve as the vehicle for securing the preliminary stakeholder buy-in, among many other useful potential outcomes, including generating Congressional support and the necessary mandate to proceed. Once the mandate is forthcoming, the Steering Committee can guide and oversee the necessary research, planning, and staged development and deployment required to create, operate, and maintain the Integrated Network of Transportation Information. This responsibility would most effectively be achieved under a Congressional charter or the establishment of a Presidential Commission.

TECHNICAL EXPERIENCE AND CAPABILITIES OF THE PROPOSER

ITS America is a voluntary association of public and private interests committed to the successful coordination, development and deployment of ITS in the United States and, as mandated by Congress, the only national public/private organization established to do so. The approximately 650 ITS America members include federal, state, local and foreign government agencies; companies involved in the development of ITS technologies and services; universities, independent research organizations, public interest groups, and any others with a stake in ITS. Private sector members account for about 57 percent of the total membership. ITS America counts as its members almost all of the major stakeholders in the U.S. ITS industry, and almost all of the U.S. companies whose main source of revenue is ITS. ITS America also has state chapters in 40 states. As part of its mission, ITS America:

♦ Helps to Define and Develop Policies as a Utilized Federal Advisory Committee to the U.S. Department of Transportation.

♦ Promotes Technical Architecture and Standards Development

♦ Develops National and International ITS Markets

♦ Clearinghouse for ITS Information.

♦ Serves as a Forum for Public and Private Interests Through More Than 20 Technical Committees And Task Forces.

♦ Showcases ITS Technologies.